

NORTH BAY

AREA

**water pollution
control plant**

1968

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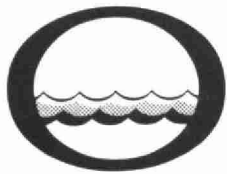
Division of Plant Operations

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Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 7
Ontario


We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.


D. S. Caverly,
General Manager.


D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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NORTH BAY AREA
water pollution control plant

operated for

THE CITY OF NORTH BAY

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

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'68 REVIEW

A total of 1,545.4 million gallons was treated at an average daily flow of 4.22 million gallons for the year compared to 3.94 million gallons in 1967. The average daily flow exceeded the design flow of 4.0 mgd approximately 65 percent of the time.

The average concentration of the raw sewage was 184 mg/l BOD and 298 mg/l suspended solids. The average concentration in the final effluent was 24 mg/l BOD and 31 mg/l suspended solids, indicating reductions of 87 percent and 90 percent respectively.

The cost of operating the plant was \$106,231.28 compared to \$94,418.15 in 1967. The cost of treatment was \$68.74 per million gallons compared to \$65.65 in 1967.

In January the City inquired into the possibility of the treatment facilities becoming a provincially owned and operated project, and also requested a report on the integrated operation of all pumping stations in the City. Consequently investigations were carried out by OWRC and City staff for the preparation of the pumping station report and the consulting firm of Gore and Storrie Limited was instructed to update their previous report which dealt with plant expansion.

PROJECT COSTS

NET CAPITAL COST (Estimated)		
Long Term Debt to OWRC		\$ <u>2,314,543.73</u>
Debt Retirement Balance at Credit		
(Sinking Fund) December 31, 1968		\$ <u>486,355.04</u>
Net Operating		\$ 109,705.75
Debt Retirement		46,708.00
Reserve		12,209.50
Interest Charged		<u>129,914.38</u>
TOTAL		\$ <u>298,537.63</u>

RESERVE ACCOUNT

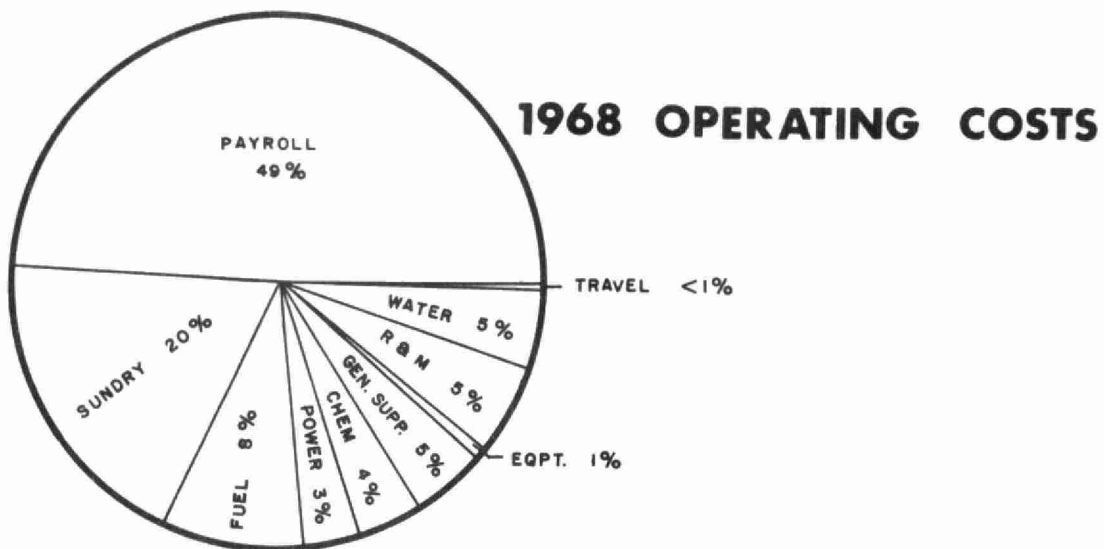
Balance @ January 1, 1968		
North Bay	\$62,246.55	
West Ferris	42,895.55	
Widdifield	<u>7,476.95</u>	\$ 112,619.05
Deposited by Municipalities		
North	\$ 6,298.77	
West Ferris	4,769.50	
Widdifield	<u>1,141.23</u>	\$ 12,209.50
Interest Earned		
North Bay	\$ 3,788.35	
West Ferris	2,583.88	
Widdifield	<u>450.38</u>	\$ 6,822.61
		\$ 131,651.16
Less Expenditures		<u>6,869.00</u>
Balance at December 31, 1968		\$ <u>124,782.16</u>

Monthly Operating Costs

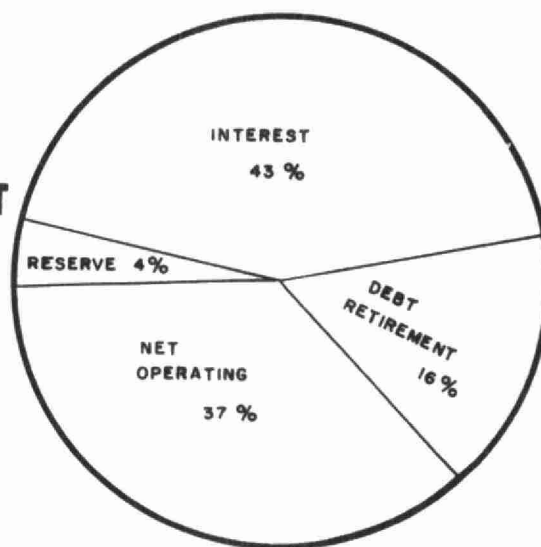
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAY ROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	4432.05	3383.45	-	617.85	-	-	293.57	-	99.30	37.88	33.96	-
FEB	7646.10	3279.66	-	892.08	392.78	-	377.08	85.12	30.00	2651.42	235.92	-
MAR	8013.71	5343.11	-	782.06	281.82	-	442.71	62.48	171.61	694.00	3.50	-
APRIL	9186.72	3346.15	204.81	832.46	269.24	2131.50	340.31	336.81	866.89	855.05	225.82	-
MAY	9591.65	3157.31	411.08	-	297.55	-	412.10	32.52	3808.85	1246.42	96.11	-
JUNE	11300.18	3315.24	806.24	1639.81	317.73	-	287.67	-	14.28	4823.10	165.10	-
JULY	7807.29	3091.38	743.70	-	353.35	-	664.66	-	165.61	2623.49	-	-
AUG	10866.53	4792.93	1031.80	758.30	320.57	2131.50	270.18	-	95.31	1465.94	1251.71	-
SEPT	6522.28	3549.68	608.32	-	464.67	-	238.58	(3.75)	40.87	330.25	-	41.95
OCT	7774.36	3320.17	341.22	1692.30	358.37	-	783.15	-	67.94	1211.21	3384.16	-
NOV	10823.39	3346.91	132.38	765.23	269.64	-	235.50	-	100.49	2589.03	-	-
DEC	12267.02	8301.83	-	802.00	235.83	-	576.44	8.82	72.71	2269.39	-	-
TOTAL	106231.28	48227.82	4279.66	8782.09	3465.55	4263.00	4921.95	522.00	5533.86	20797.23	5396.28	41.95

*SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$14,723.76

BRACKETS INDICATE CREDIT



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G.TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1964	1234.3	\$ 72,953.91	\$59.10	4 cents
1965	1380.0	79,171.60	57.37	6 cents
1966	1386.4	87,375.11	63.02	6 cents
1967	1438.2	94,418.15	65.65	4 cents
1968	1545.4	106,231.28	68.74	4 cents

Process Data

A total of 1,545.4 million gallons was treated during the year. This represents an average daily flow for the year of approximately 4.22 mgd compared to 3.94 mgd in 1967, an increase of approximately seven percent.

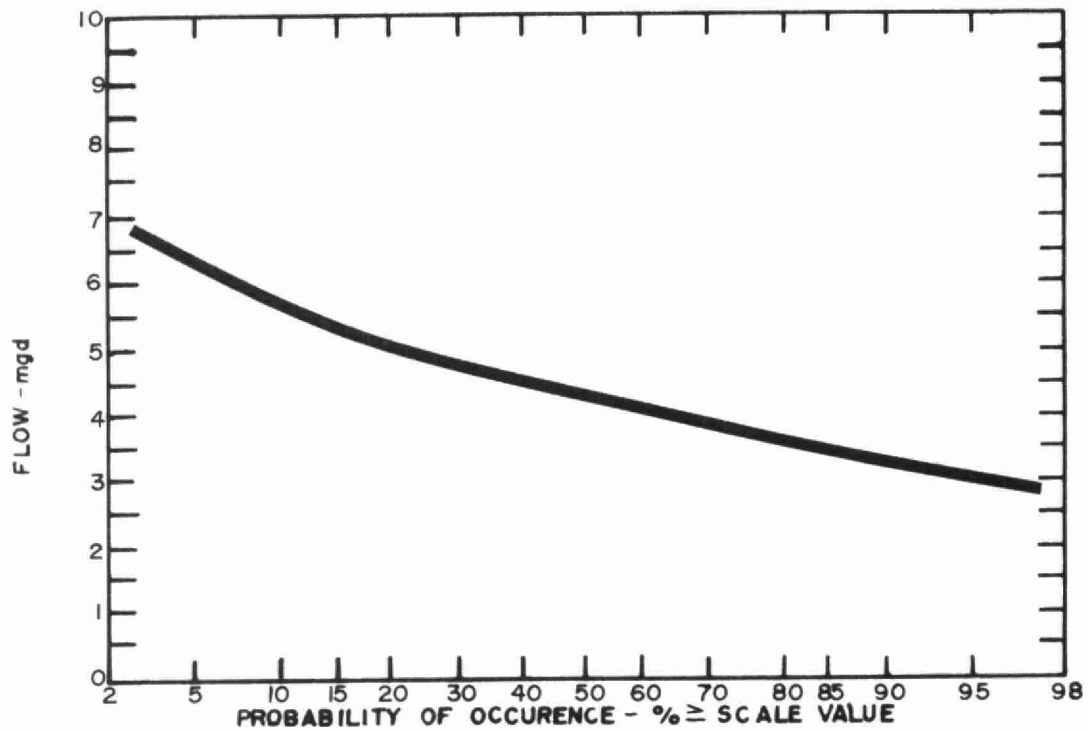
The plant flow exceeded the design flow of 4.0 mgd approximately 65 percent of the time, 5.0 mgd 22 percent of the time and 6.0 mgd seven percent of the time.

The plant effluent was chlorinated from April 1 to October 31. A total of 56,000 pounds of chlorine was used on 986.9 million gallons during this period. This represents an average dosage of 5.7 mg/l required to maintain a chlorine residual of 0.5 mg/l in the plant effluent.

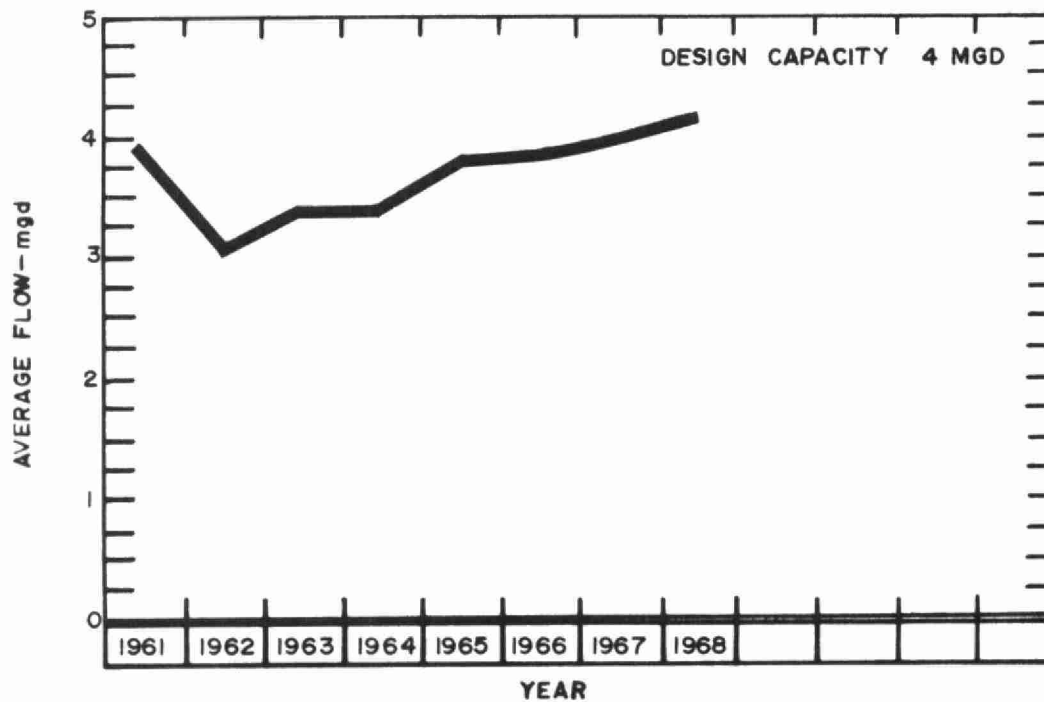
PLANT FLOWS and CHLORINATION

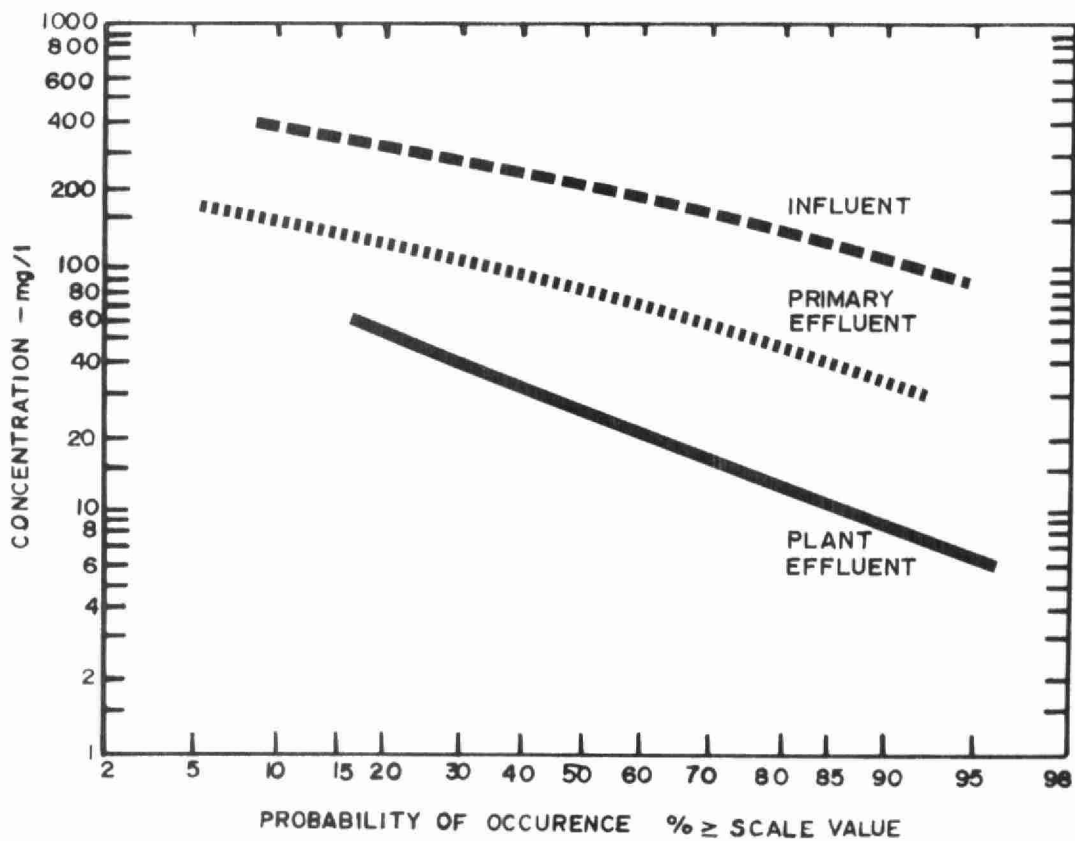
MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED lbs.	DOSAGE mg/l
JAN	89.0	2.87	3.26	2.42	0	-
FEB	98.4	3.39	5.14	1.67	0	-
MAR	141.3	4.56	6.37	3.54	0	-
APR	178.4	5.95	8.76	4.65	-	-
MAY	148.6	4.80	6.62	4.11	-	-
JUN	121.7	4.06	4.89	2.46	-	-
JUL	133.9	4.32	4.77	3.08	-	-
AUG	142.1	4.58	5.62	4.41	-	-
SEPT	136.9	4.56	5.89	3.84	-	-
OCT	125.3	4.04	4.65	3.74	-	-
NOV	113.8	3.79	4.62	3.17	0	-
DEC	116.0	3.74	4.76	2.86	0	-
TOTAL	1545.4	-	-	-	-*	-
AVERAGE	-	4.22	-	-	-	-

* Not metered

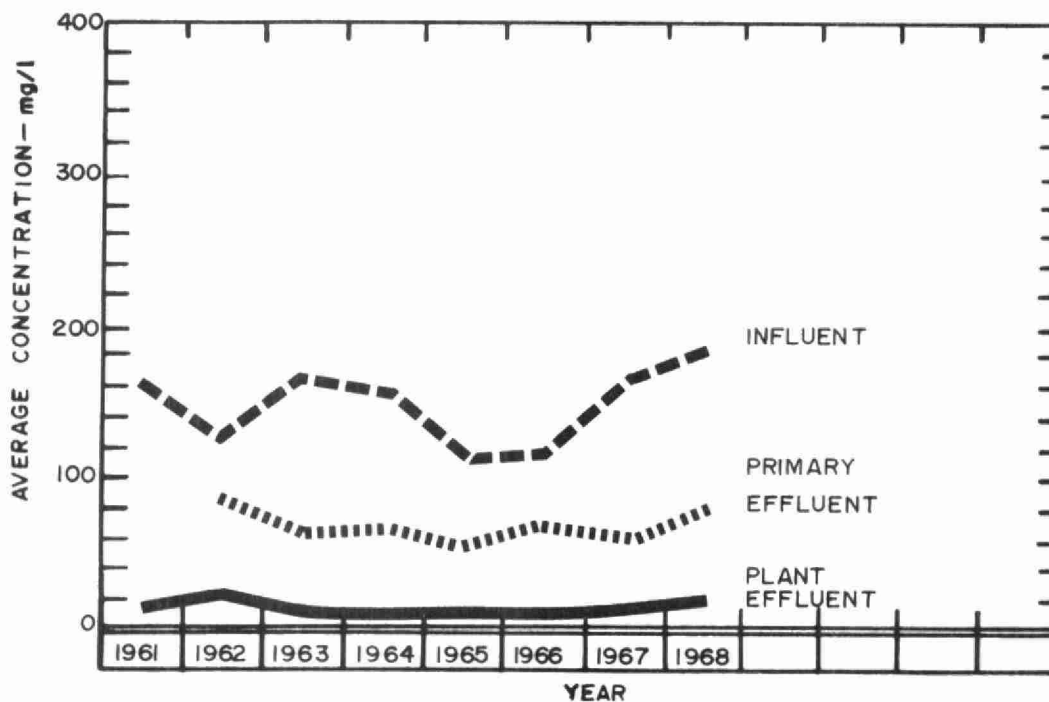


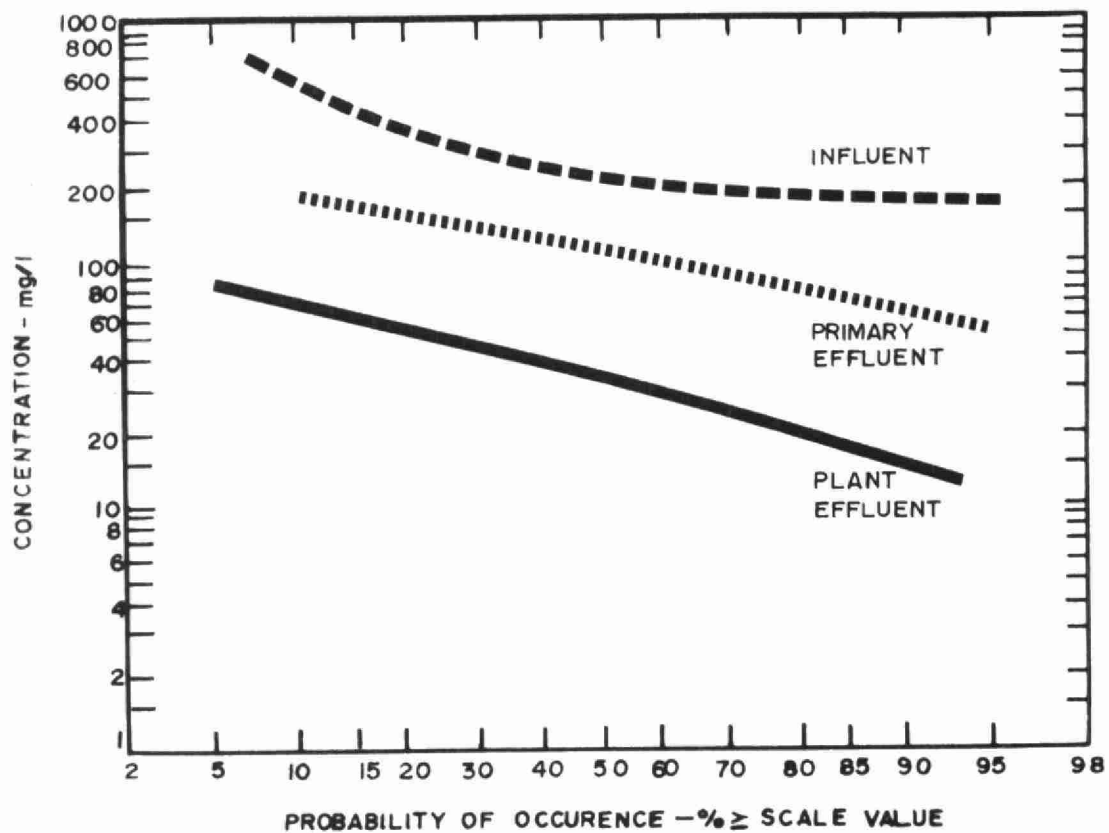
FL O W S



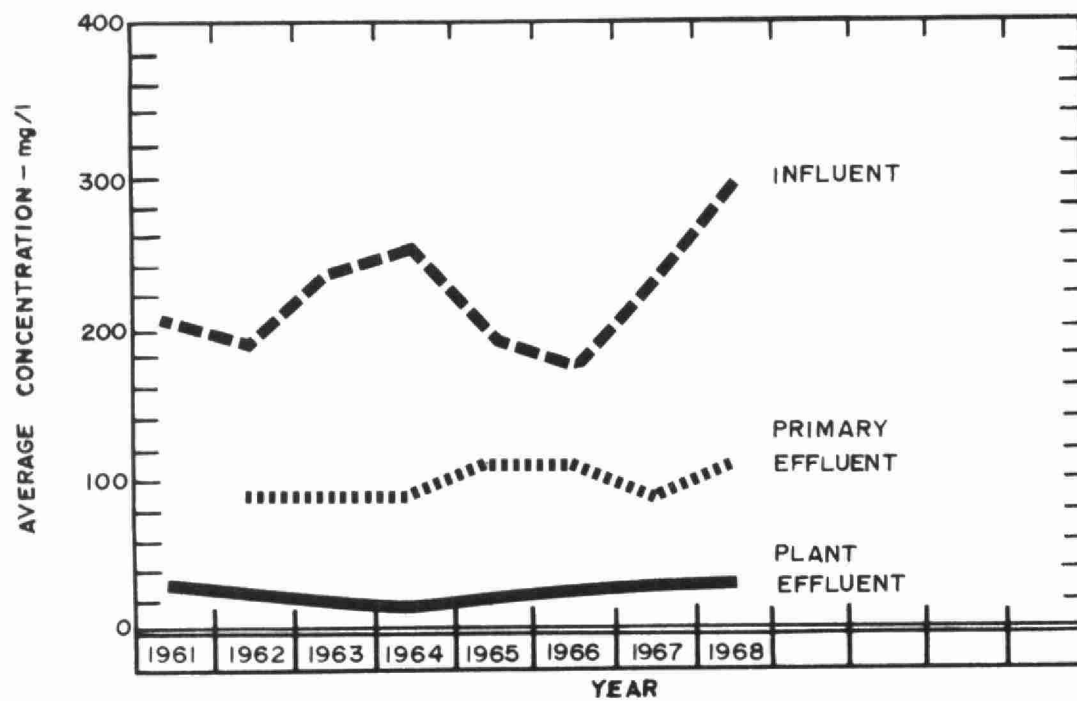


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ⁵ lb	INF CONC ^N mg/l	EFF CONC ^N mg/l	RED ^N %	REMOVAL 10 ⁵ lb	REMOVAL ft ³
JAN	91	15	84	.68	162	25	85	1.22	490
FEB	350	36	90	3.09	241	17	93	2.20	532
MAR	120	26	78	1.33	415	44	89	4.44	590
APR	-	-	-	-	-	-	-	-	652
MAY	140	39	72	1.50	193	28	86	2.45	596
JUN	-	-	-	-	-	-	-	-	469
JULY	114	24	79	1.20	325	54	83	3.63	629
AUG	140	36	74	1.48	204	26	87	2.53	618
SEPT	175	13	93	2.22	221	34	85	2.56	477
OCT	160	34	79	1.56	214	62	71	1.91	444
NOV	350	9	97	3.88	842	2	99+	9.56	692
DEC	195	12	94	2.12	160	15	91	1.68	634
TOTAL	-	-	-	-	-	-	-	-	6823
AVERAGE	184	24	87	1.91	298	31	90	3.22	569

COMMENTS

Raw sewage having an average concentration of 184 mg/l in BOD and 298 mg/l in suspended solids was treated in 1968. It should be noted there was a high suspended solids concentration in November which raised the average for the year. The final effluent had an average concentration of 24 mg/l in BOD and 31 mg/l in suspended solids. The final effluent concentrations were above the OWRC objective of 15 mg/l for BOD and suspended solids.

The average reduction in BOD was 87 percent and in suspended solids was 90 percent. These reductions are slightly lower than expected.

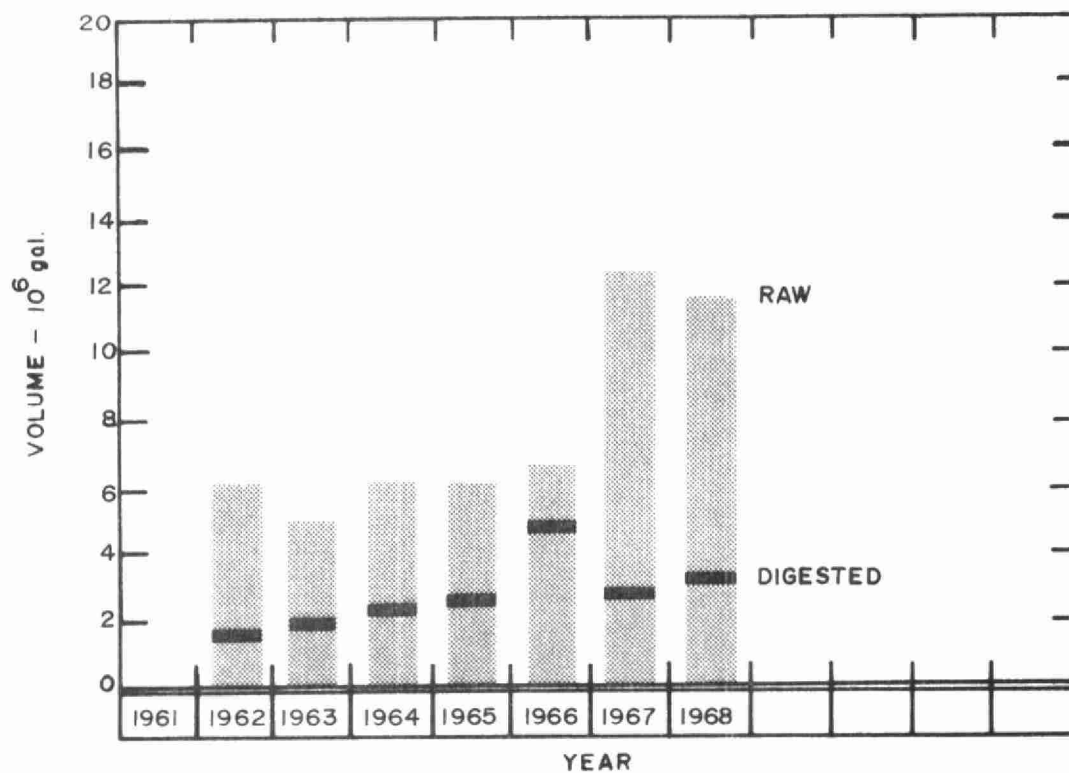
A total of 6,823 cubic feet of grit was removed for an average of 4.4 cubic feet of grit per million gallons treated.

AERATION

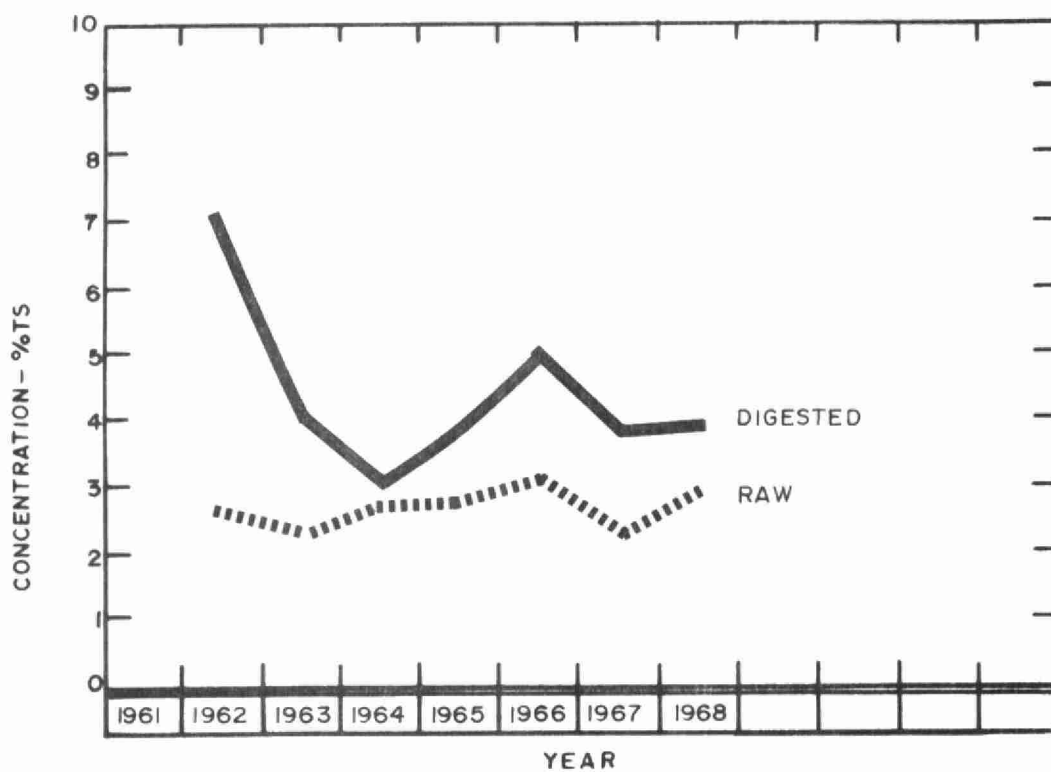
MONTH	AVERAGE FLOW mgd	PRIMARY EFF		SECONDARY EFF		MLSS CONC ^N mg/l	F/M $\left(\frac{\text{lb BOD}}{\text{lb MLSS}}\right)$	AIR USED $\left(\frac{1000 \text{ ft}^3}{\text{lb BOD}}\right)$ REMOVED	WASTE SLUDGE lb
		BOD CONC ^N mg/l	SS CONC ^N mg/l	BOD CONC ^N mg/l	SS CONC ^N mg/l				
JAN	2.87	46	79	15	25	1,630	.08	5.22	-
FEB	3.39	145	166	36	17	1,670	.26	1.27	-
MAR	4.56	55	130	26	44	1,490	.16	3.54	-
APRIL	5.95	-	-	-	-	1,530	-	-	-
MAY	4.80	100	165	39	28	1,680	.26	1.60	-
JUN	4.06	-	-	-	-	1,330	-	-	-
JUL	4.32	50	63	24	54	1,210	.16	4.16	-
AUG	4.58	48	39	36	26	1,580	.13	8.51	-
SEPT	4.56	73	114	13	34	1,340	.23	1.71	-
OCT	4.04	-	-	-	-	2,560	-	-	-
NOV	3.79	135	128	9	2	1,430	.33	.98	-
DEC	3.74	78	110	12	15	1,770	.15	1.90	-
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	4.22	81	110	23	27	1,602	.20	2.63	-

COMMENTS

The primary effluent had an average concentration of 81 mg/l in BOD and the average MLSS concentration was 1,602 mg/l resulting in an average loading of 20 lbs. of BOD per 100 lbs. of MLSS or an F/M ratio of 0.20. An average of 3,120 cubic feet of air was used per pound of BOD removed.



DIGESTION



SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10 ⁵ gal	T. S. %	V. S. %	VOLUME 10 ⁵ gal	T. S. %	V. S. %	VOLUME gal	T. S. %	LIQUID yd ³	DEWATERED yd ³
JAN	7.44	2.2	-	2.88	4.0	-	-	0.3	1912	0
FEB	6.96	2.9	-	2.96	3.8	-	-	-	1759	0
MAR	7.44	6.8	-	1.85	4.3	-	-	1.3	1099	0
APR	8.52	-	-	2.09	-	-	-	-	1242	0
MAY	11.16	2.5	-	3.53	4.3	-	-	1.2	2093	0
JUN	10.80	-	-	4.11	-	-	-	-	2438	0
JUL	11.16	4.4	-	3.57	3.8	-	-	4.6	2116	0
AUG	11.16	2.5	-	2.93	5.1	-	-	0.2	1736	0
SEPT	10.80	0.4	-	2.79	3.1	-	-	0.2	1656	0
OCT	11.16	1.0	-	3.02	1.0	-	-	.8	1793	0
NOV	10.80	3.0	-	2.93	7.6	-	-	2.6	1736	0
DEC	11.16	4.1	-	2.03	2.6	-	-	.4	1208	0
TOTAL	118.56	-	-	34.69	-	-	-	-	20788	0
AVERAGE	9.88	3.0	-	2.89	4.0	-	-	1.3	1732	0

COMMENTS

A total of 11,856,000 gallons of sludge was pumped to the digesters in 1968 at an average concentration of 3.0 percent solids. A total of 3,469,000 gallons of digested sludge at an average concentration of 4.0 percent solids was pumped from the digester in 1968. The digested sludge was removed by tank truck.

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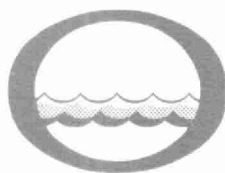
CONCLUSIONS

The plant operated on an average above the design capacity of 4.0 mgd. The concentrations of BOD and suspended solids in the final effluent were not within the OWRC objectives, indicating that overloading occurred frequently during the year. Apart from process efficiency, the operation of the plant was quite satisfactory.

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